Chapter 4　Environmental Business Development among Small- and Medium-Sized Manufacturing Companies

This chapter looks at the results of a survey that this economic research group carried out among 1,000 small- and medium-sized enterprises (SMEs) in the machinery and metal industries. Based on the results of this survey, called "Survey on the State of Environmental Business among SMEs and the Challenges Ahead," we analyze what SMEs are doing in the area of environmental business. (The Survey was conducted between mid-December 2003 and late-January 2004. There were 148 effective responses to the survey, a 14.8% response rate.)

4.1 Environmental Business: Promising Areas, Thriving Areas, Planned Areas

(1) Promising Technology Areas of Environmental Business (General Categories)

Chart 4-1 shows the total of responses regarding the promising technology areas of environmental business for SMEs (general categories, multiple responses possible). As you can see, the most promising technology fields are waste treatment and recycling (62.8%); energy (54.1%); air and atmosphere (39.2%); water and soil (32.4%); eco-goods and eco-materials (25.7%); and environmental services (23%). This shows that many SMEs expect waste treatment and recycling and energy to develop into promising new markets. (It must be noted, however, that the survey contained more questions on waste treatment and recycling than on other topics.) At the same time, there are a fair amount of companies that expect the area of environmental services to develop into a new market, so it is not only the manufacturing fields that hold promise.
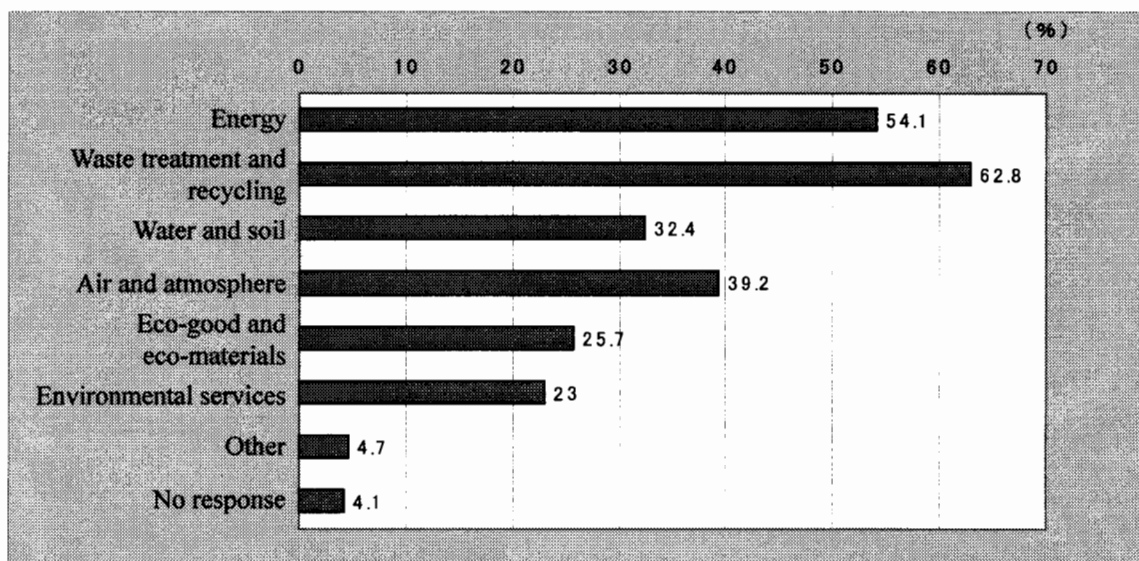

Chart 4-1　Promising technology fields of environmental business (general categories; N=148; multiple responses)

(2) Promising Technology Fields of Environmental Business (Detailed Categories)

Chart 4-2 shows the total of responses regarding the promising technology areas of environmental business (detailed categories). There are 44 categories, including "others." As you can see from this diagram, the most promising technology fields are energy efficiency electricity saving, and cogeneration (38%); solar power, wind power, and solar heating (29.7%); and the two categories of garbage-fueled power, RDF, biomass, and fuel cells, and eco-goods, health goods, eco-products, and health products (both 20.9%). This shows that SMEs hold high hopes for the technology fields of energy-efficiency, power generation, and eco-product-related fields.
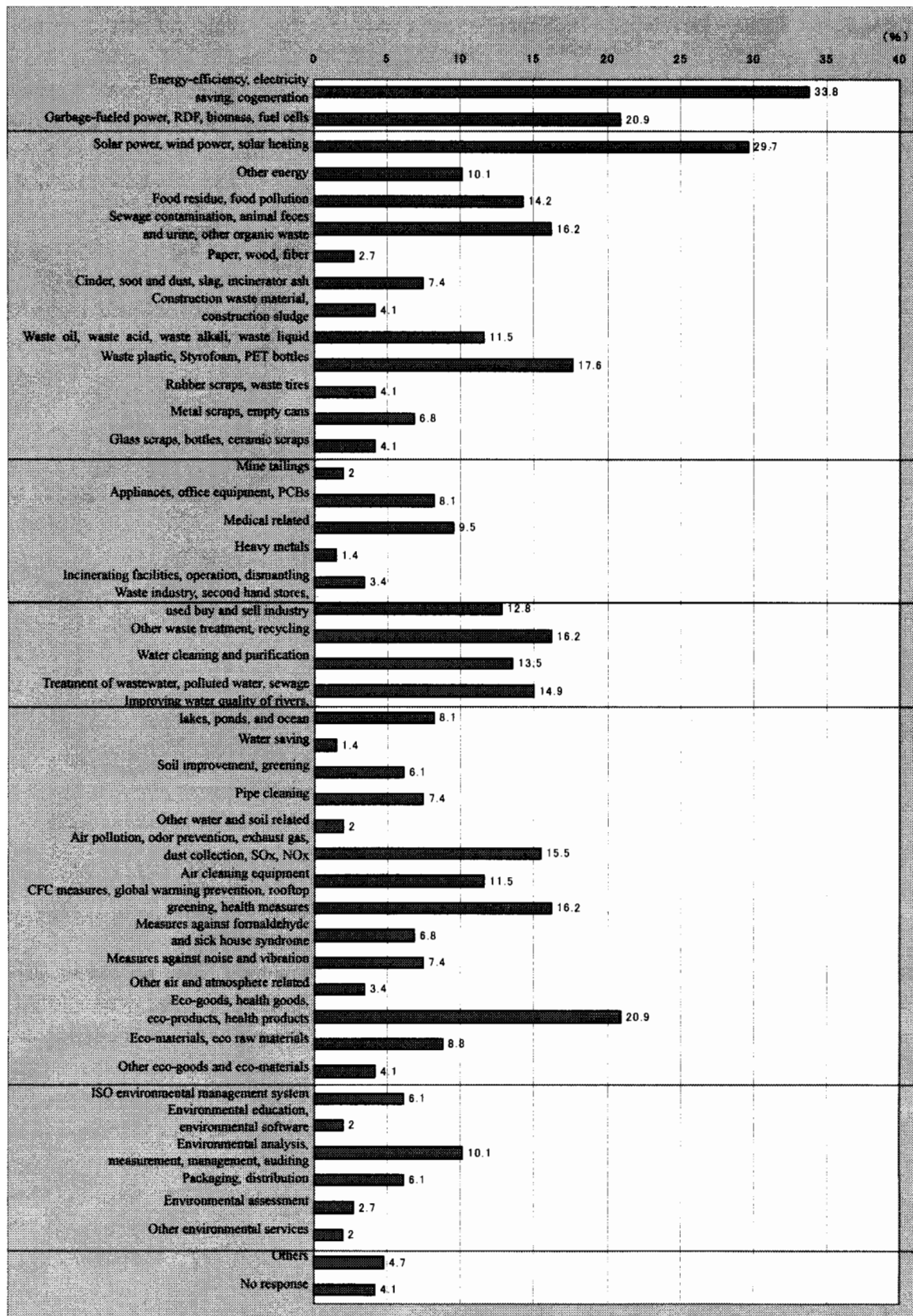
Category	Value (%)
Energy-efficiency, electricity saving, cogeneration	33.8
Garbage-fueled power, RDF, biomass, fuel cells	20.9
Solar power, wind power, solar heating	29.7
Other energy	10.1
Food residue, food pollution	14.2
Sewage contamination, animal feces and urine, other organic waste	16.2
Paper, wood, fiber	2.7
Cinder, soot and dust, slag, incinerator ash	7.4
Construction waste material, construction sludge	4.1
Waste oil, waste acid, waste alkali, waste liquid	11.5
Waste plastic, Styrofoam, PET bottles	17.6
Rubber scraps, waste tires	4.1
Metal scraps, empty cans	6.8
Glass scraps, bottles, ceramic scraps	4.1
Mine tailings	2
Appliances, office equipment, PCBs	8.1
Medical related	9.5
Heavy metals	1.4
Incinerating facilities, operation, dismantling	3.4
Waste industry, second hand stores, used buy and sell industry	12.8
Other waste treatment, recycling	16.2
Water cleaning and purification	13.5
Treatment of wastewater, polluted water, sewage	14.9
Improving water quality of rivers, lakes, ponds, and ocean	8.1
Water saving	1.4
Soil improvement, greening	6.1
Pipe cleaning	7.4
Other water and soil related	2
Air pollution, odor prevention, exhaust gas, dust collection, SOx, NOx	15.5
Air cleaning equipment	11.5
CFC measures, global warming prevention, rooftop greening, health measures	16.2
Measures against formaldehyde and sick house syndrome	6.8
Measures against noise and vibration	7.4
Other air and atmosphere related	3.4
Eco-goods, health goods, eco-products, health products	20.9
Eco-materials, eco raw materials	8.8
Other eco-goods and eco-materials	4.1
ISO environmental management system	6.1
Environmental education, environmental software	2
Environmental analysis, measurement, management, auditing	10.1
Packaging, distribution	6.1
Environmental assessment	2.7
Other environmental services	2
Others	4.7
No response	4.1

**Chart 4-2 Promising technology fields of environmental business
(detailed categories; N=148; multiple responses)**

(3) Technology Fields Developed In-House (General Categories)

Chart 4-3 shows the total of responses regarding technology fields (general categories) in which companies are pursuing business in-house (multiple responses possible). As you can see, the most pursued fields are waste treatment and recycling (39.3%); energy (31%); water and soil (27.4%); and air and atmosphere (25%). This looks very much like Chart 4-1, Promising technology fields of environmental business.

83 of the 84 effective survey responses an-swered this question (one did not respond), showing that 83 companies are pursuing some form of environmental business in some technology field. These 83 responses account for 58.5% of the 142 responses (six did not respond) to the aforementioned question on promising technology fields of environmental business. In other words, this figure represents the state of SMEs in the manufacturing industry pursuing environmental business. We can thus assume that just under 60% of these SMEs are pursuing environmental business.
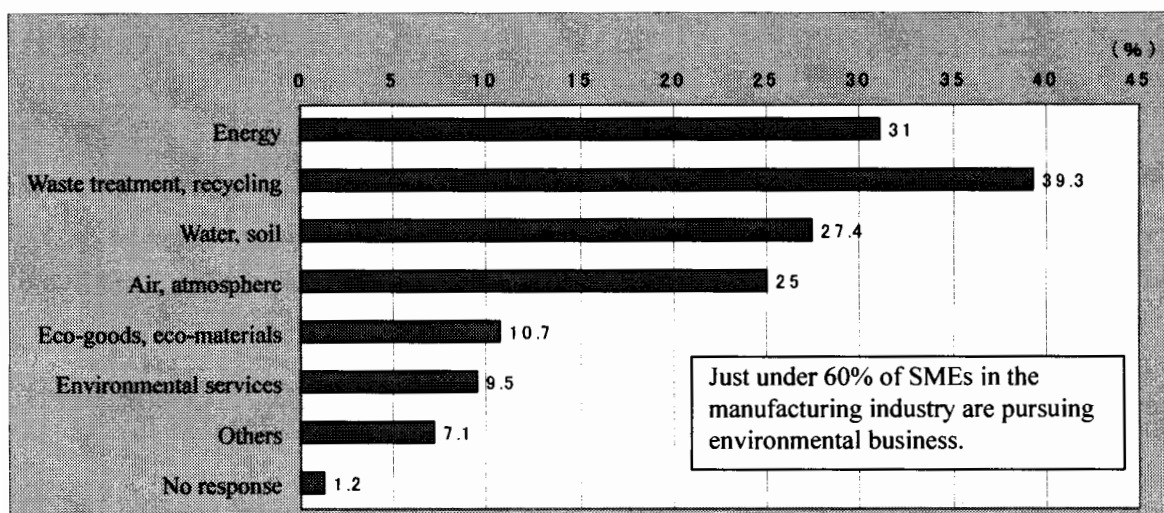

Chart 4-3   Technology fields being developed in-house
(general categories, N=84, multiple responses)

(4) Technology Fields Being Developed In-House (Detailed Categories)

Chart 4-4 shows the total of responses regarding technology fields (detailed categories) in which companies are pursuing business in-house. As you can see, the highest responses were for energy-efficiency, electricity savings, and cogeneration (15.5%); water cleaning and purification, and treatment of wastewater, polluted water, and sewage (both 14.3%); solar power, wind power, and solar heating, and sewage contamination, animal feces and urine, other organic waste (both 11.9%); and air pollution, odor prevention, exhaust gas, dust collection, SOx, NOx (10.7%).

However, the category of eco-goods, health goods, eco-products, and health products received just 8.3% of responses, while the low response rate for environmental services indicated that there are still very few companies pursuing this field of business. From this, we can infer that most of the companies in this survey perform the business under subcontracting as opposed to developing and making their own products.
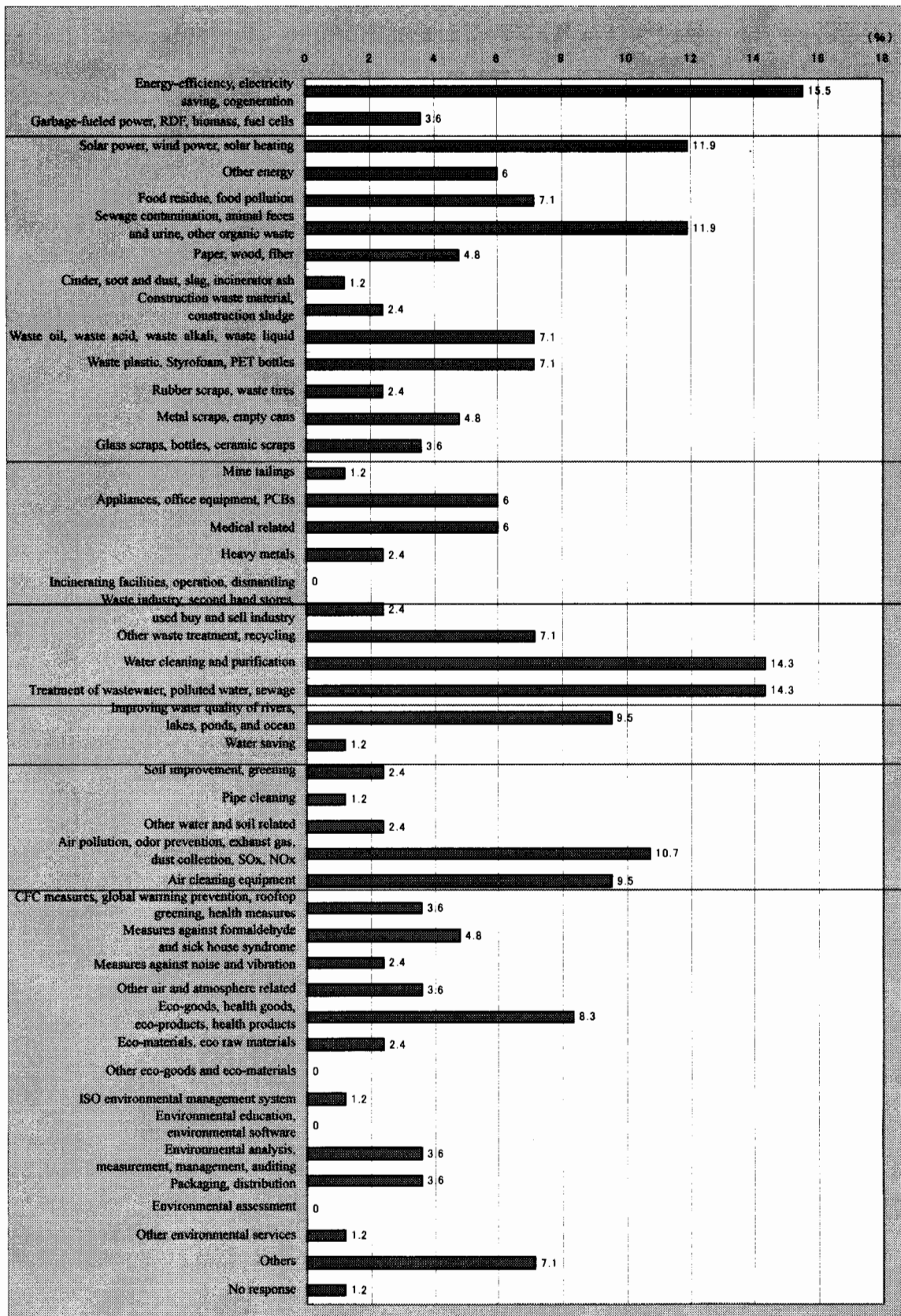
Chart 4-4 Technology fields being developed in-house
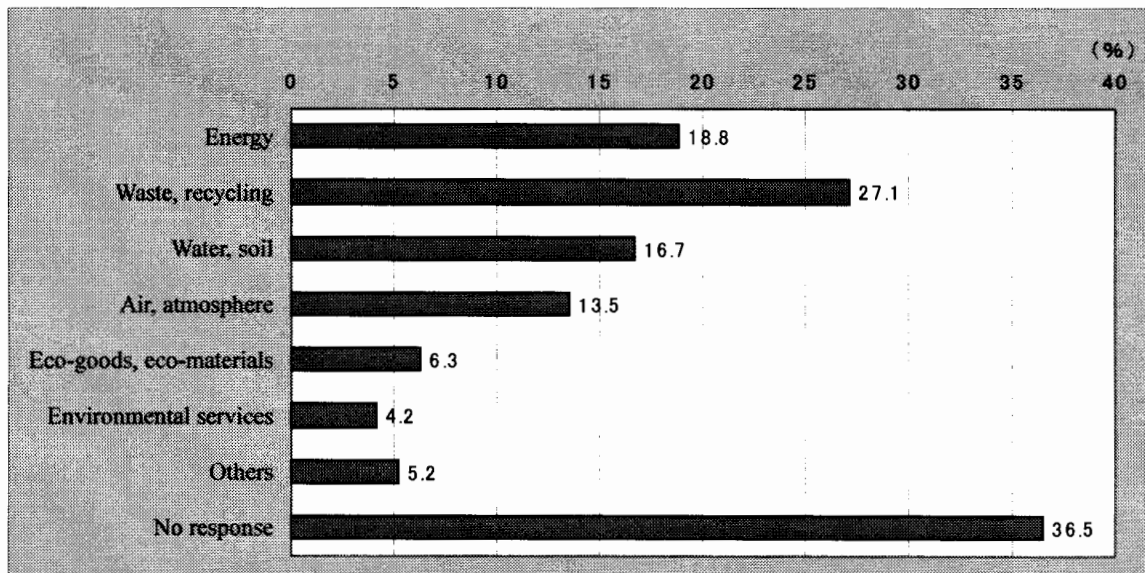**(detailed categories, N=84, multiple responses)**

The chart shows the following categories and percentage values:

Category	%
Energy-efficiency, electricity saving, cogeneration	15.5
Garbage-fueled power, RDF, biomass, fuel cells	3.6
Solar power, wind power, solar heating	11.9
Other energy	6
Food residue, food pollution	7.1
Sewage contamination, animal feces and urine, other organic waste	11.9
Paper, wood, fiber	4.8
Cinder, soot and dust, slag, incinerator ash	1.2
Construction waste material, construction sludge	2.4
Waste oil, waste acid, waste alkali, waste liquid	7.1
Waste plastic, Styrofoam, PET bottles	7.1
Rubber scraps, waste tires	2.4
Metal scraps, empty cans	4.8
Glass scraps, bottles, ceramic scraps	3.6
Mine tailings	1.2
Appliances, office equipment, PCBs	6
Medical related	6
Heavy metals	2.4
Incinerating facilities, operation, dismantling	0
Waste industry, second hand stores, used buy and sell industry	2.4
Other waste treatment, recycling	7.1
Water cleaning and purification	14.3
Treatment of wastewater, polluted water, sewage	14.3
Improving water quality of rivers, lakes, ponds, and ocean	9.5
Water saving	1.2
Soil improvement, greening	2.4
Pipe cleaning	1.2
Other water and soil related	2.4
Air pollution, odor prevention, exhaust gas, dust collection, SOx, NOx	10.7
Air cleaning equipment	9.5
CFC measures, global warming prevention, rooftop greening, health measures	3.6
Measures against formaldehyde and sick house syndrome	4.8
Measures against noise and vibration	2.4
Other air and atmosphere related	3.6
Eco-goods, health goods, eco-products, health products	8.3
Eco-materials, eco raw materials	2.4
Other eco-goods and eco-materials	0
ISO environmental management system	1.2
Environmental education, environmental software	0
Environmental analysis, measurement, management, auditing	3.6
Packaging, distribution	3.6
Environmental assessment	0
Other environmental services	1.2
Others	7.1
No response	1.2

(5) Technology Fields to be Pursued Within 3 Years (General Categories)

Chart 4-5 shows the total of responses regarding technology fields (general categories) in which companies plan to pursue business within 3 years (multiple responses possible). As you can see, the fields in which most companies plan to pursue business within 3 years are waste treatment and recycling (27.1%); energy (18.8%); water and soil (16.7%); and air and atmosphere (13.5%).

This looks very much like Chart 4-1, promising technology fields of environmental business (general categories), and figure 4.3, Technology fields being developed in-house (general categories).

From what the survey shows, we can infer that SMEs in the manufacturing industry are not likely to change their direction, at least in the next 3 years, regarding promising technology fields of environmental business, technology fields being developed in-house, and key technology fields for environmental business.

Chart 4-5   Technology fields in which companies plan to pursue business within 3 years (general categories, N=96, multiple responses)

(6) Technology Fields to be Pursued Within 3 Years (Detailed Categories)

Chart 4-6 shows the total of responses regarding technology fields (detailed categories) in which companies plan to pursue business within 3 years. As you can see, all of the categories received a fairly even distribution of the responses, showing that companies plan to pursue business in a wide range of fields.

However, there are some categories with a relatively high response rate: solar power, wind power, and solar heating, and treatment of wastewater, polluted water, and sewage (both 9.4%); energy-efficiency, electricity savings, and cogeneration (8.3%); and waste plastic, Styrofoam, and PET bottles (6.3%).

As far as we can see from only these results, and as was pointed out in the results of the general categories, it doesn't appear that SMEs will drastically change the fields they pursue within the next three years.
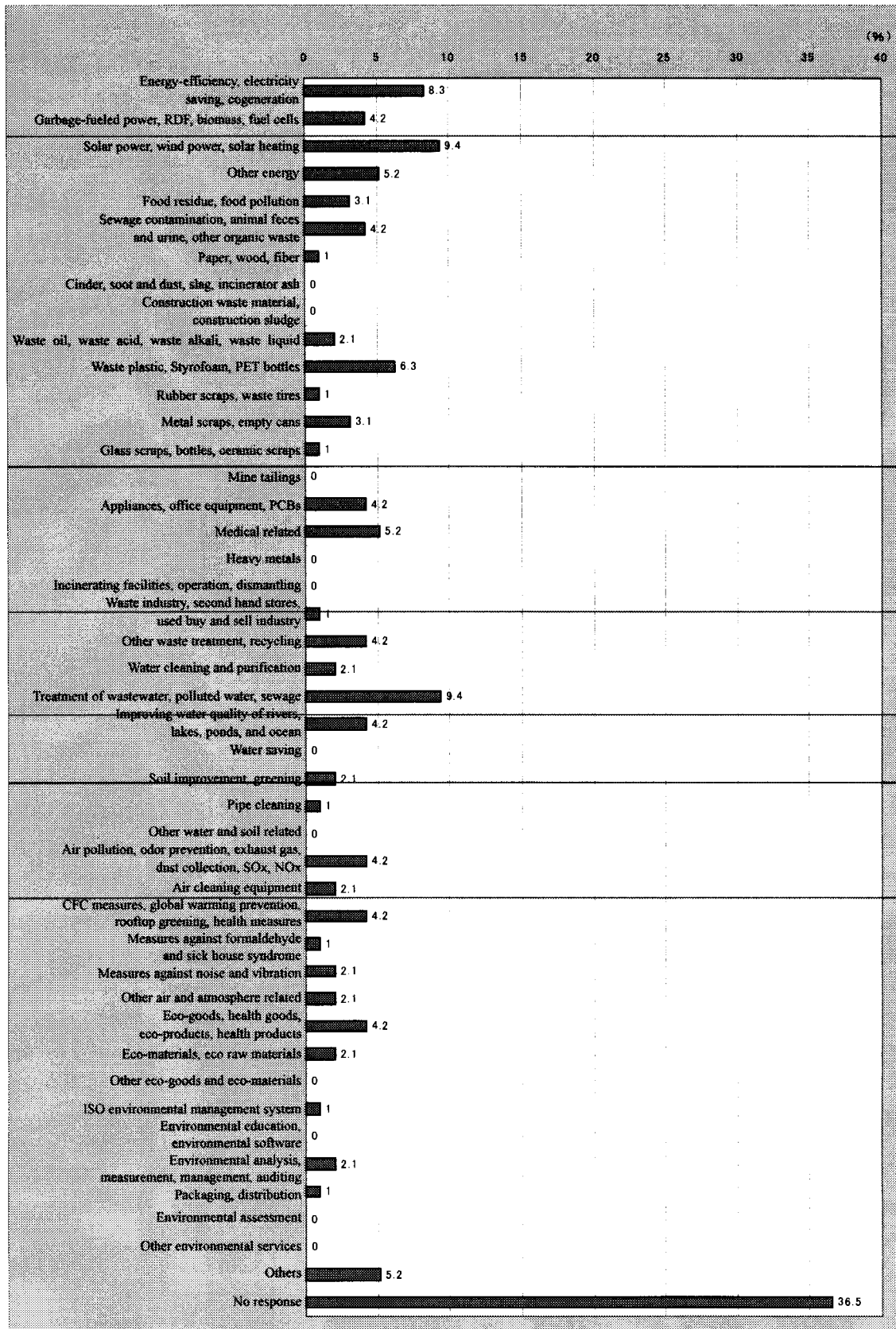
Technology field	%
Energy-efficiency, electricity saving, cogeneration	8.3
Garbage-fueled power, RDF, biomass, fuel cells	4.2
Solar power, wind power, solar heating	9.4
Other energy	5.2
Food residue, food pollution	3.1
Sewage contamination, animal feces and urine, other organic waste	4.2
Paper, wood, fiber	1
Cinder, soot and dust, slag, incinerator ash	0
Construction waste material, construction sludge	0
Waste oil, waste acid, waste alkali, waste liquid	2.1
Waste plastic, Styrofoam, PET bottles	6.3
Rubber scraps, waste tires	1
Metal scraps, empty cans	3.1
Glass scraps, bottles, ceramic scraps	1
Mine tailings	0
Appliances, office equipment, PCBs	4.2
Medical related	5.2
Heavy metals	0
Incinerating facilities, operation, dismantling	0
Waste industry, second hand stores, used buy and sell industry	1
Other waste treatment, recycling	4.2
Water cleaning and purification	2.1
Treatment of wastewater, polluted water, sewage	9.4
Improving water quality of rivers, lakes, ponds, and ocean	4.2
Water saving	0
Soil improvement, greening	2.1
Pipe cleaning	1
Other water and soil related	0
Air pollution, odor prevention, exhaust gas, dust collection, SOx, NOx	4.2
Air cleaning equipment	2.1
CFC measures, global warming prevention, rooftop greening, health measures	4.2
Measures against formaldehyde and sick house syndrome	1
Measures against noise and vibration	2.1
Other air and atmosphere related	2.1
Eco-goods, health goods, eco-products, health products	4.2
Eco-materials, eco raw materials	2.1
Other eco-goods and eco-materials	0
ISO environmental management system	1
Environmental education, environmental software	0
Environmental analysis, measurement, management, auditing	2.1
Packaging, distribution	1
Environmental assessment	0
Other environmental services	0
Others	5.2
No response	36.5

Chart 4-6   Technology fields in which companies plan to pursue business within 3 years
(general categories, N=96, multiple responses)

4.2 Focus Fields of Environmental Business, Motives for Environmental Business

(1) Focus Fields of Environmental Business

Chart 4-7 shows the survey results regarding focus fields of environmental business, including those fields that respondents intend to focus on in future. As you can see, because most of the survey respondents were SME manufacturers in the machine and metal industries, almost 80% of them said their focus fields were development, design, and manufacture. Meanwhile, distribution, sales, and wholesale/retail and service, maintenance, construction, and installation were both less than 10%.

Development, design, and manufacture **Distribution, sales, and wholesale/retail**
Service, maintenance, construction, and installation **No response**
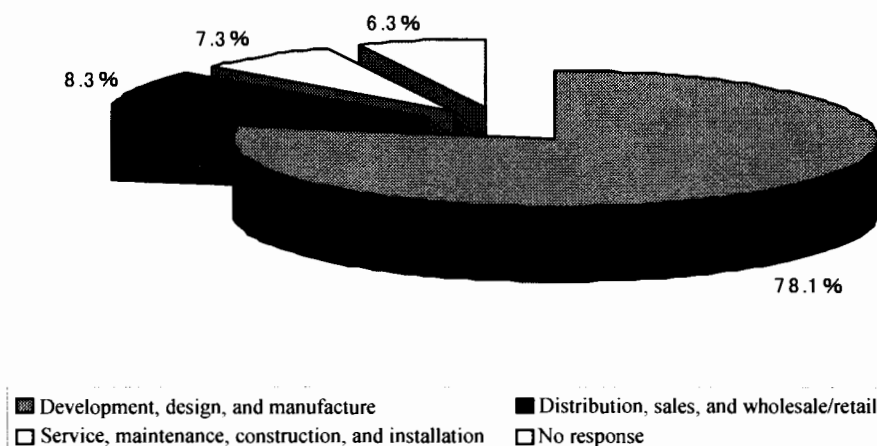
Chart 4-7   Environmental business focus fields (N=96)

(2) Motives for Environmental Business, Ways Companies Pursue Environmental Business

Chart 4-8 shows the reasons companies decided to pursue environmental business, including those fields they intend to pursue in future (multiple responses possible). As you can see, almost 80% of respondents chose "Decided independently," giving this item the most responses. Many of the survey respondents were companies that outsource, so "Decided due to request from major customer" also got many responses, almost 20%. "Decided after advice from public support organization" received 4.2% (4) responses.

As is shown here, although about 20% of respondents decided to pursue environmental business due to requests from major customers, most SMEs in the manufacturing industry did so of their own accord. This shows high level of autonomy among the SMEs.
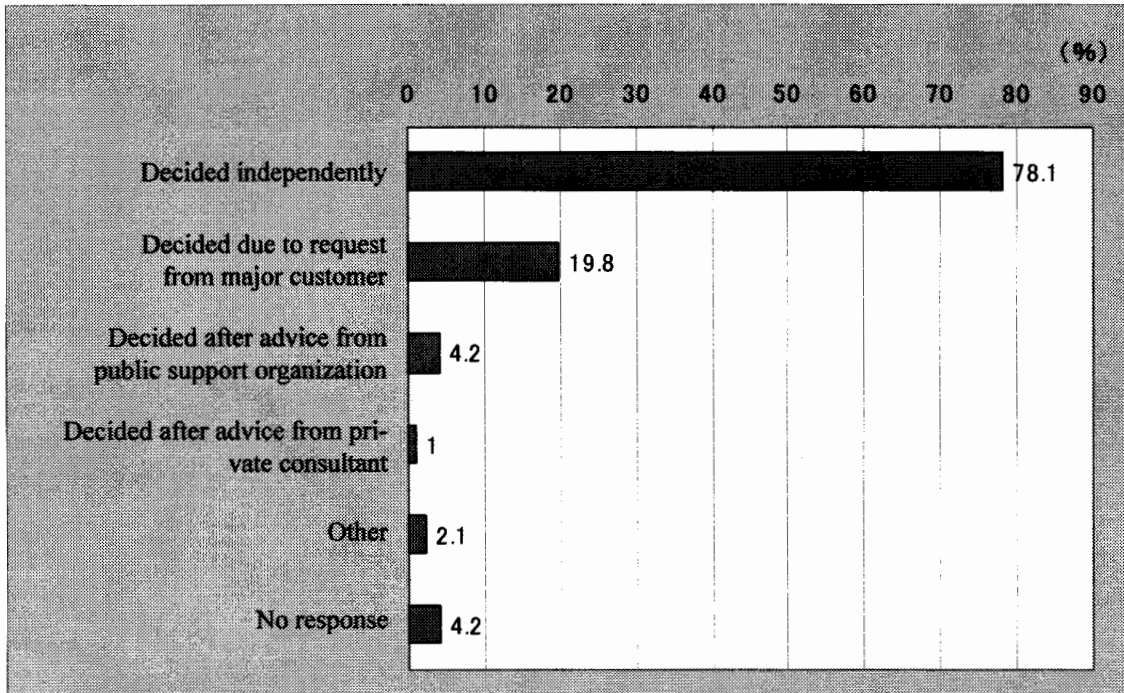
Chart 4-8 Motives for environmental business (N=96, multiple responses)

(3) Ways Companies Pursue Environmental Business

Chart 4-9 shows the total responses regarding the ways that companies pursue environmental business (multiple responses possible). As you can see, the top response with over 60%, was "As a proprietary in-house business." Also garnering a large number of responses were "As part of joint industry-academia-government activities" (31.3%) and "As part of joint research with a major customer" (30.2%). This shows a trend of either industry-academia-government cooperation or collaboration with major customers. As well, "As part of a group with companies in other industries" received 9.4% (9 responses) while "As part of a group with other outsourcing companies" was just 6.3% (6 responses).

As you can see from these results, 60% of companies said they were doing or planned to do environmental business as their own proprietary business, showing a strong trend of pursuing business in-house. However, both "As part of joint industry-academia-government activities"

and "As part of joint research with a major customer" garnered a 30% response, showing that companies are pursuing environmental business in a variety of ways.

We can see a connection between the type of company—either one that develops and makes it own products or one that makes its products under subcontracting—and its response to this item of the survey.

In other words, while companies that make their own products—less than 50% of their products are those under subcontracting—carry out environmental business as an in-house proprietary effort, this could be seen as environmental business via joint industry-academia-government action. As well, while companies that make their products under subcontracting—more than 50% of their products are those under subcontracting—can be seen as carrying out environmental business as an in-house proprietary effort, we can infer that they also carry out environmental business through joint development with major customers.
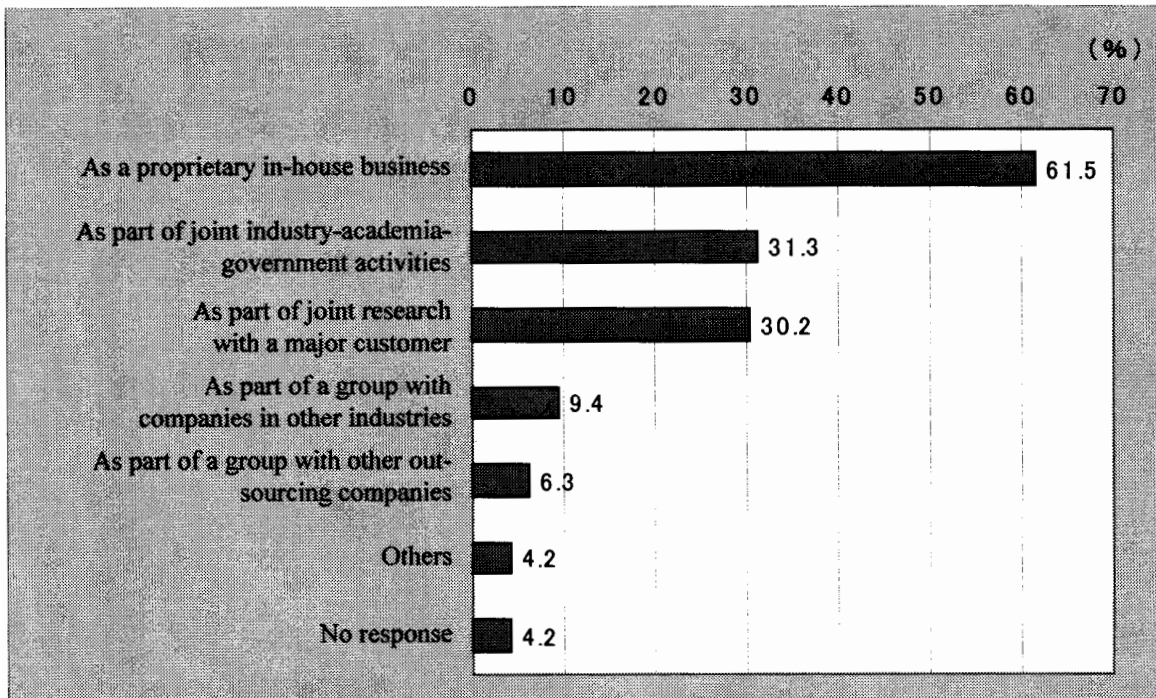
Chart 4-9　Ways that companies pursue environmental business (N=96, multiple responses)

4.3 Effects and Assessment of Environmental Business

(1) Positive Effects of Environmental Business

Chart 4-10 shows the total responses (multiple responses possible) regarding the positive effects (direct and indirect effects) of environmental business. As you can see, the two categories of "Gain new customers" and "Improved brand image" were both strong, with 48.8% of responses each. Also ranked high was "Improved levels of design, development, and technology," at 47.6%. These responses show that environmental business brings about positive effects for SMEs in the manufacturing industry.

Other effects perceived by the respondents were "Strengthening employee incentive" (26.2%) and "Improved ability to negotiate with and make proposals for existing customers," both of which demonstrate the fact that many respondents see environmental business as boosting management resources. In particular, regarding "Improved ability to negotiate with and make proposals for existing customers," if we consider that many of the respondents were companies that

make their products under subcontracting, then we can infer that this is one of the most important effects.

Meanwhile, a relatively large number of respondents, 28.8%, chose "Creates networks with universities and research institutes," a result that can be said to be related to the previous survey question on ways that companies pursue environmental business. This confirms the importance of creating networks that allow SMEs in the manufacturing industry to make use of outside resources such as universities and research institutes.

From these results, we can see that environmental business brings positive effects to SMEs in the manufacturing industry, particularly in helping gain new customers, raising brand image, and improving the ability to negotiate with and make proposals for existing customers. We can thus infer that environmental business supplements and strengthens management resources, an area in which SMEs may be lacking.
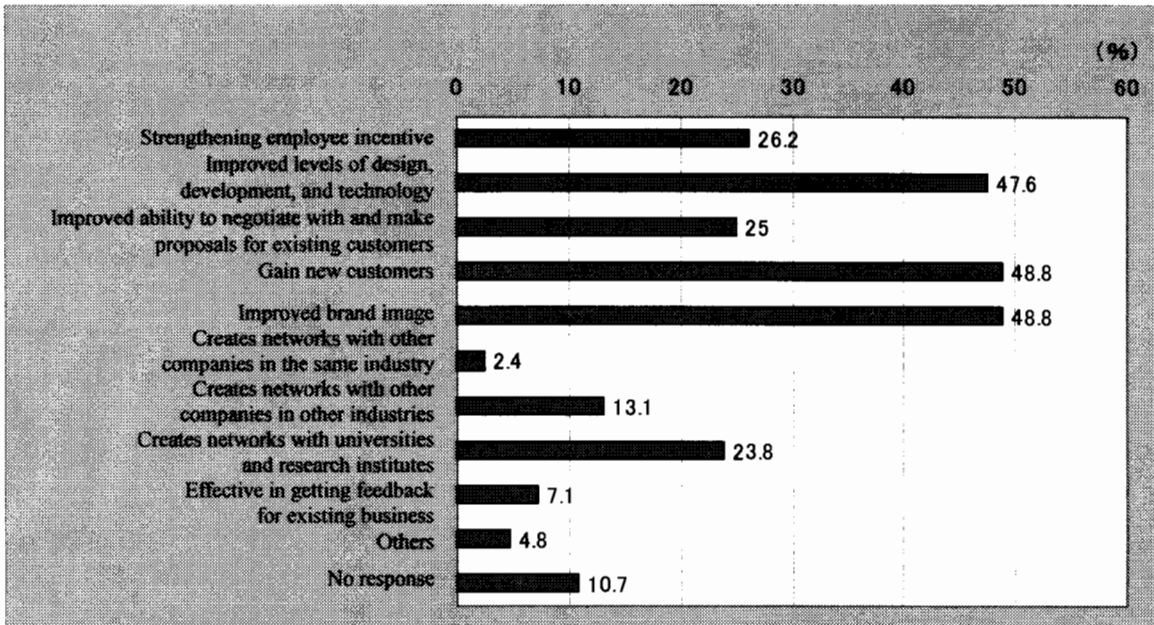
Chart 4-10   Positive effects of environmental business (N=84, multiple responses)

(2) Self Assessment of Environmental Business

Chart 4-11 shows the total responses regarding self assessment of environmental business. As you can see, the two items that had the most responses (28.8%) were "Business results are slightly lower than we first expected" and "Haven't reached the point where we can make an assessment."
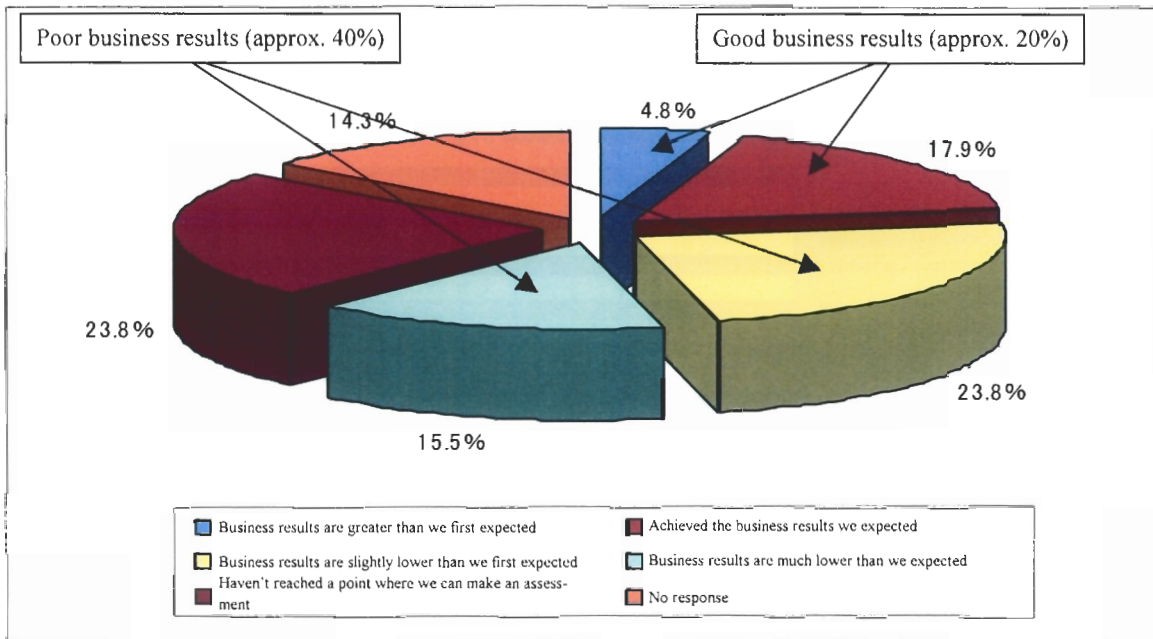
These were followed by "Achieved the business results we expected" (17.9%) and "Business results are much lower than we first expected" (15.5%). Only 4.8% responded "Business results are greater than we first expected."

If we divide companies into those whose environmental business did not meet initial expectations and those whose environmental business exceeded initial expectations, we get companies with poor business results (39.3%) and companies with good business results (22.7%). Overall, there are more companies who said that environmental business results were lower than they first expected.

Furthermore, if we add those companies that answered "Haven't reached the point where we can make an assessment" to the poor business results group, this adds up to more than 60% of companies that gave a harsh assessment of their environmental business.

To sum up, although companies mentioned a number of positive effects of environmental business in the previous section, the fact is that there are many companies that are keenly aware of the fact that environmental business did not live up to initial expectations.

Poor business results (approx. 40%)

Good business results (approx. 20%)

14.3%
4.8%
17.9%
23.8%
15.5%
23.8%

- ■ Business results are greater than we first expected
- ■ Achieved the business results we expected
- ■ Business results are slightly lower than we first expected
- ■ Business results are much lower than we expected
- ■ Haven't reached a point where we can make an assessment
- ■ No response

Chart 4-11　How companies rate environmental business (N=84)

4.4 Obstacles to Environmental Business, Help Needed from Government

(1) Obstacles to Environmental Business

Chart 4-12 shows the obstacles that respondents said they faced in pursuing environmental business (free answer format). As you can see, the biggest obstacle to environmental business (48 responses) faced by SMEs in the manufacturing industry was "Lack of capital for development and other purposes." This was followed by "Lack of environmental-business-savvy human resources" (20 responses), "Lack of marketing and sales capabilities" (18 responses), "Government regulations, lack of expertise by government officials" (16 responses), and "Lack of know-how, technology, and technology information" (13 responses). This shows that the obstacles to environmental business are mostly in the form of capital, human resources, technology, and sales; things directly related to the internal environmental of the SMEs.

However, we cannot ignore the fact that a relatively large number of companies gave external factors like "Government regulations, lack of expertise by government officials" as an obstacle. In environmental business, companies often develop products and services based on ideas and technologies that are totally new. In pointing out these external environmental factors, there were many companies that pointed to the lack of understanding and ability on the part of the government, in the form of things like rigid regulations concerning business and paperwork.

These results suggest that while both SMEs in the manufacturing industry and all private enterprises in general must strengthen their internal environments, they must also improve how they deal with government as far as negotiations, paperwork, and presenting their environmental business ideas in a convincing manner. As well, these results remind us that in other new markets like medical care and welfare as well, how well companies negotiate with government will determine the success or failure of business.

Only two companies answered that user-related problems with environmental products and services was an obstacle to environmental business. From this we can infer that companies don't perceive user-related problems to be a major obstacle to environmental business.
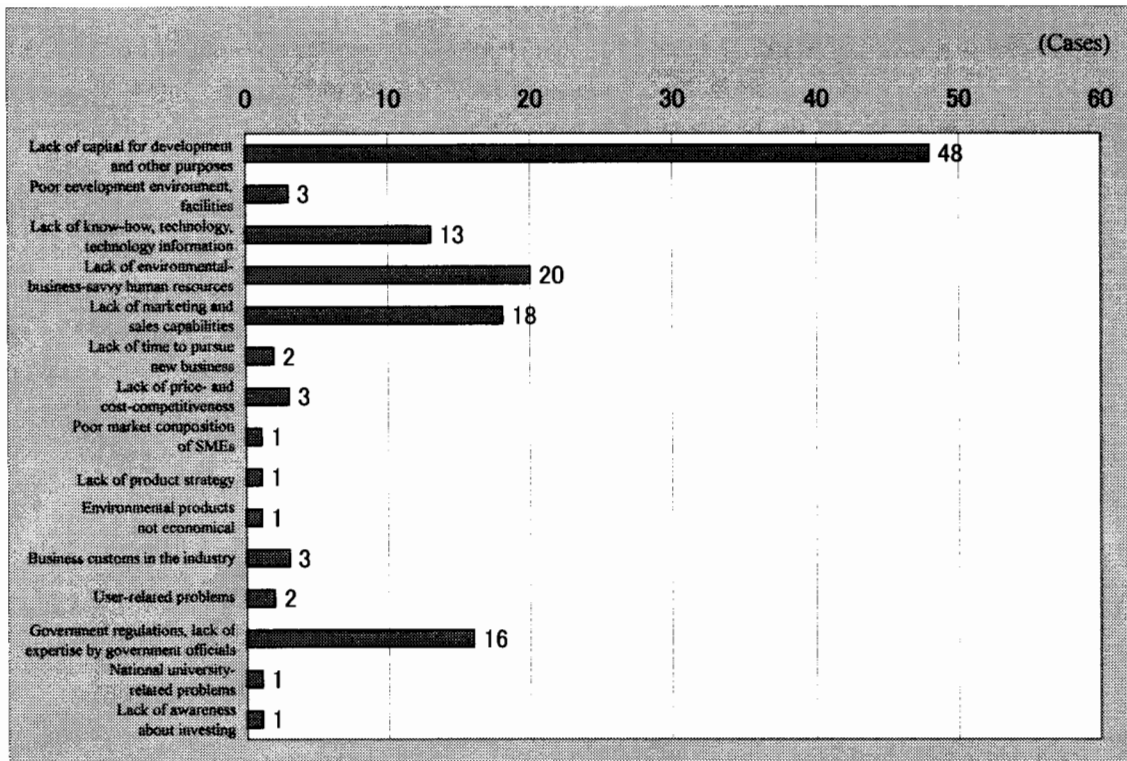
Chart 4-12   Obstacles to environmental business
(N=81, free answers put into categories)

(2) Opinions About, and Requests to, Public Support Organizations

Chart 4-13 shows free answers (separated into categories) given by respondents with their requests to public support organizations. As you can see, the leading response was "Support in the form of development funding and subsidies" (19 responses). This seems to back up the claim in the previous section on obstacles to environmental business that companies face a lack of capital for development and other purposes.

Another important request was "Support after product goes to market" (4 responses). It's important because up to now most of the support offered by public institutes has tended to go into new product development and new business development; the result of this being that people are now pointing out the necessity for follow-up after the completion of new technologies and products. Another response related to product-completion follow-up was "Follow-up on patents and utility models" (1 response).

Other responses that were hard to ignore were in the category of "Information and know-how related to the support institutes themselves" (4 responses). In other words, companies may want to take advantage of support, but have no idea of where and how to get it, and exactly what services they need.

There are currently an increasing number of prefectural, city, and town governments that are offering support for SMEs. But these governments must work to publicize exactly what services they are offering to as wide an audience as possible. There were also 3 responses requesting "Improvement of consultation services for SMEs." This is an indication that companies want to see improved capabilities of support organizations; for example, they want the organization to offer advice on the kind of paperwork necessary and on how well a product or service is likely to sell in the market.

Two respondents answered "Bidding should be open to SMEs." This is an indication that the government has a tendency to do business with large companies in environmental business and that SMEs therefore face obstacles to participation in doing business with government bodies. Of course, in the field of environmental business, there is a good chance that the products or services will eventually be sold on a large scale covering an entire region, so in order to carry out business on such a large scale, companies supplying the products or services must have suffice-ent amounts of capital and employees and sufficient levels of technology and know-how. However, SMEs can prosper in environmental business of a relatively small scale, and if SMEs are to enjoy improved business we mustn't close the door of opportunity to them. Consequently, the question of opening the bidding process indicates that something must be done to help SMEs gain access to major government supply markets, not only in the field of environmental business but in other areas as well.
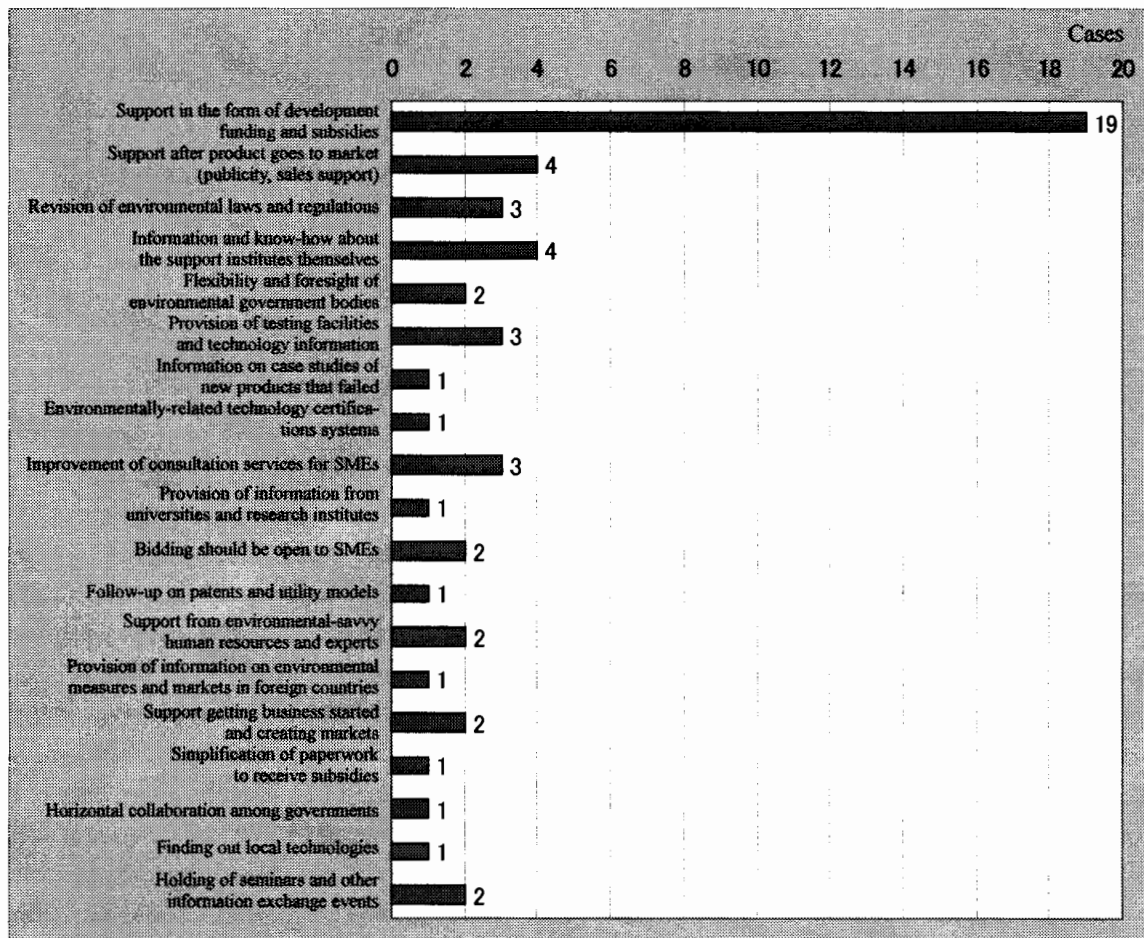
Chart 4-13 Requests to public support organizations
(N=54, free answers put into categories)